

REMARKS

I. Introduction

By the present Amendment, claims 1, 9, and 11 have been amended. Claim 6 has been cancelled. Accordingly, claims 1-5 and 7-12 remain pending in the application.

II. Office Action Summary

In the Office Action of March 31, 2009, claim 6 was rejected under 35 U.S.C. §112, second paragraph, as being indefinite. Claims 1, 6, and 9 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent Application 2006/0052702 to Matsumura et al ("Matsumura"). Claims 205, 7, 8, and 10-12 were rejected under 35 U.S.C. §103(a) as being unpatentable over Matsumura in view of U.S. Patent 7,455,640 issued to Suzuki et al ("Suzuki"). These rejections are respectfully traversed.

III. Rejections under 35 USC §112

Claim 6 was rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter regarded as the invention. Regarding this rejection, the Office Action indicates that the phrase "the color elastic image is displayed alternatively a larger region or a smaller region than the setting physical quantity with a set hue" is confusing and indefinite.

By the present Amendment, claim 6 has been cancelled, thereby rendering this particular ground of rejection moot.

IV. Rejections under 35 USC §102

Claims 1, 6, and 9 were rejected under 35 U.S.C. §102(b) as being anticipated by Matsumura et al. Regarding this rejection, the Office Action alleges that Matsumura discloses an ultrasonic imaging apparatus that comprises an ultrasonic probe which receives and sends ultrasonic waves, an ultrasound imaging structure that generates an ultrasound image on the basis of a reflected echo signal, an elastic image structuring that obtains a physical quantity of the elasticity of the object of a region corresponding to the ultrasound image and generates a color elastic image, a display that overlays the ultrasound image to the color elastic image or arranges the ultrasound image and the color elastic image and displays the resultant image on a screen, and an input for variably setting a corresponding relationship between a hue of the color elastic image displayed on the screen and the level of a physical quantity. Applicants respectfully disagree.

By the present Amendment, Applicants have amended independent claim 1 to better define the invention and incorporate features that are not shown or suggested by the art of record. As amended, independent claim 1 defines an ultrasound imaging apparatus that comprises:

an ultrasonic probe that receives and sends ultrasonic waves from/to an object;

ultrasound image structuring means that generates an ultrasound image on the basis of a reflected echo signal received by the ultrasonic probe;

elastic image structuring means that obtains a physical quantity of the elasticity of the object of a region corresponding to the ultrasound image on the basis of the reflected echo signal and generates a color elastic image;

display means that overlays the ultrasound image to the color elastic image, or arranges the ultrasound image and the color elastic image and displays the resultant image on a screen; and

input means that variably sets a corresponding relationship between a hue of the color elastic image displayed on the screen and the level of a physical quantity;

wherein the color elastic image is generated in accordance with a set physical quantity of the elasticity and a set hue set by the input means, so that at least one of regions having a larger or a smaller physical quantity of the elasticity than the set physical quantity of the elasticity is displayed with the set hue.

The ultrasonic imaging apparatus of independent claim 1 includes an ultrasonic probe that receives and sends ultrasonic waves to/from an object, and an ultrasound image structuring means that generates an ultrasound image based on reflected echo signals received by the ultrasonic probe. An elastic image structuring means is provided to obtain a physical quantity of the elasticity with the object of a region corresponding to the ultrasound image based on the reflected echo signal and to generate a color elastic image. A display means is provided to overlay the ultrasound image to the color elastic image, or arrange the ultrasound image and the color elastic image, and display the resultant image on a screen. An input means variably sets a corresponding relationship between a hue of the color elastic image displayed on the screen and the level of physical quantity. According to independent claim 1, the color elastic image is generated according to a set physical quantity of the elasticity and a set hue that is set by the input means in order to have at least one of the regions having a larger or smaller physical quantity of the elasticity than the set physical quantity of the elasticity can be displayed with the set hue. See page 21, line 17 to page 25, line 12 of the Specification. At least one benefit achieved by the arrangement of independent claim 1 is that the region with strain which must be extracted can be displayed by the boundary portion between one soft region and one hard region.

Matsumura discloses an ultrasound diagnostic device wherein a relationship between the tissue and its elastic behavior can be diagnosed with an ultrasound diagnostic image. The device includes means for generating a translucent image from the color elasticity image based on image information of either the tomographic image or the color elasticity image, and overlapping the translucent image and the tomographic image. A means is also provided for displaying the combined image. With this structure, relation between the tissue and its elastic behavior can be properly diagnosed with the ultrasound diagnostic image.

Contrary to the invention of independent claim 1, Matsumura appears to only disclose a technique for forming a combined image using a tomographic image of an object to be examined and an elasticity image that presents hard and soft tissue from the object. The combined image is subsequently displayed as a translucent image. Matsumura further indicates that an outline detecting means can be used to detect a borderline between tissues having different elastic behavior in the color elasticity image based on the predetermined threshold of the elasticity, and also to generate a combined image of the detected borderline and the generated tomographic image. See Figs. 6 and 7, and corresponding text. Matsumura, however, never addresses some of the features of independent claim 1, and in particular, the color conversion table. Matsumura fails to provide any disclosure or suggestion for features now recited in independent claim 1, such as:

wherein the color elastic image is generated in accordance with a set physical quantity of the elasticity and a set hue set by the input means, so that at least one of regions having a larger or a smaller physical quantity of the elasticity than the set physical quantity of the elasticity is displayed with the set hue.

It is therefore respectfully submitted that independent claim 1 is allowable over the art of record.

Claims 2-5 and 7-12 depend from independent claim 1, and are therefore believed allowable for at least the reasons set forth above with respect to independent claim 1. In addition, these claims each introduce novel elements that independently render them patentable over the art of record.

V. Rejections under 35 USC §103

Claims 2-5, 7, 8, and 10-12 were rejected under 35 U.S.C. §103(a) as being unpatentable over Matsumura in view of Suzuki. Regarding this rejection, the Office Action alleges that Matsumura discloses all of the features recited in independent claim 1. Suzuki is relied upon for disclosing the additional features found in these dependent claims.

Claims 2-5, 7, 8, and 10-12 depend from independent claim 1, and are therefore believed to be allowable over the art of record. As previously discussed, Matsumura actually fails to provide any disclosure or suggestion for various features that are recited in independent claim 1. Furthermore, these features do not appear to be disclosed or suggested by Suzuki. Consequently, the combination of Matsumura and Suzuki still fails to provide any disclosure or suggestion for all of the features recited in these claims.

It is therefore respectfully submitted that these claims are further allowable over the art of record.

VI. Conclusion

For the reasons stated above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a Notice of Allowance is believed in order, and courteously solicited.

If the Examiner believes that there are any matters which can be resolved by way of either a personal or telephone interview, the Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.

AUTHORIZATION

Applicants request any shortage or excess in fees in connection with the filing of this paper, including extension of time fees, and for which no other form of payment is offered, be charged or credited to Deposit Account No. 01-2135 (Case: 389.46211X00).

Respectfully submitted,
ANTONELLI, TERRY, STOUT & KRAUS, LLP.

/Leonid D. Thenor
Leonid D. Thenor
Registration No. 39,397

LDT/dlh
1300 N. Seventeenth Street
Suite 1800
Arlington, Virginia 22209
Tel: 703-312-6600
Fax: 703-312-6666

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